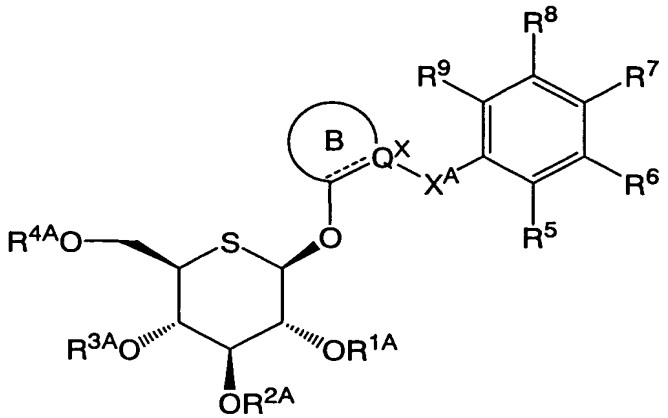
CLAIMS

1. A 5-thio-β-D-glucopyranoside compound of the following formula or a pharmaceutically acceptable salt thereof or a hydrate thereof:



[wherein

B represents a heteroaryl group which may be substituted with any substituent,

R^{1A}, R^{2A}, R^{3A} and R^{4A}, which may be the same or different, each represent a hydrogen atom, a C_{2-10} acyl group, a C_{7-10} aralkyl group, a C_{2-6} alkoxycarbonyl group, a C_{1-6} alkoxy-C_{2-10} acyl group or a C_{1-6} alkoxy-C_{2-6} alkoxycarbonyl group,

Q^X represents N or C,

X^A represents $-(CH_2)n-$, $-CO(CH_2)n-$, $-C(OH)(CH_2)n-$, $-O-(CH_2)n-$, $-CONH(CH_2)n-$, $-NHCO(CH_2)n-$ (wherein n is an integer of 0 to 3), -COCH=CH-, -S- or -NH-, provided that when Q^X is N, X^A represents $-(CH_2)n-$, $-CO(CH_2)n-$, $-C(OH)(CH_2)n-$, $-CONH(CH_2)n-$ (wherein n is an integer of 0 to 3)

or -COCH=CH-, and

R^5, R^6, R^7, R^8 and R^9, which may be the same or different, each represent:

a hydrogen atom;

a halogen atom;

a hydroxyl group;

a C_{1-6} alkyl group which may be substituted with one or more substituents selected from the group consisting of a halogen atom and a hydroxyl group;

a group represented by the formula:

$$-(CH_2)m'-Q'$$

{wherein m' represents an integer of 0 to 4, and Q' represents a formyl group, an amino group, a nitro group, a cyano group, a carboxyl group, a sulfonic acid group, an optionally halogen-substituted C_{1-6} alkoxy group, a C_{1-6} alkoxy-C_{1-6} alkoxy group, a C_{2-10} acyloxy group, a C_{2-10} acyl group, a C_{2-6} alkoxycarbonyl group, a C_{1-6} alkylthio group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, -NHC(=O)H, a C_{2-10} acylamino group, a C_{1-6} alkylsulfonylamino group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, a carbamoyl group, an N-(C_{1-6} alkyl)aminocarbonyl group, or an N,N-di(C_{1-6} alkyl)aminocarbonyl group}; or

a C_{3-7} cycloalkyl group, a C_{3-7} cycloalkyloxy group, an aryl group, a C_{7-10} aralkyl group, an aryloxy group, a C_{7-10} aralkyloxy group, a C_{7-10} aralkylamino group, a heteroaryl group, or a 4- to 6-membered heterocycloalkyl group, provided that each of these groups may be substituted with 1 to 4 substituents selected from the group consisting of a

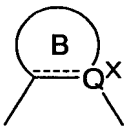
halogen atom, a hydroxyl group, a C_{1-6} alkyl group and a C_{1-6} alkoxy group].

2. The compound according to claim 1, wherein X^A is $-(CH_2)n-$ or $-CO(CH_2)n-$ (wherein n is an integer of 0 to 3), or a pharmaceutically acceptable salt thereof or a hydrate thereof.

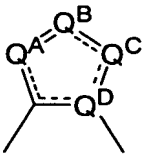
3. The compound according to claim 1, wherein X^A is $-CH_2-$ or -CO-, or a pharmaceutically acceptable salt thereof or a hydrate thereof.

4. The compound according to claim 1, wherein X^A is $-CH_2-$, or a pharmaceutically acceptable salt thereof or a hydrate thereof.

5. The compound according to any one of claims 1 to 4, wherein the moiety represented by the formula:



is a group represented by the formula:

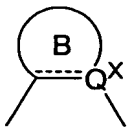


[wherein at least one of Q^A to Q^D represents a nitrogen atom, and the other each independently represent $-C-Z^Y$, provided that when Q^D is C, any one of the ring nitrogen atoms may be substituted with Z^X

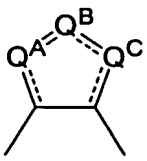
(wherein Z^X represents an optionally halogen-substituted C_{1-6} alkyl group; an optionally halogen-substituted C_{3-7} cycloalkyl group; a C_{2-10} acyl group; a C_{2-6} alkoxycarbonyl

group; a phenyl or C_{7-10} aralkyl group which may be substituted with one or more substituents selected from the group consisting of a halogen atom, a C_{1-6} alkyl group, a C_{1-6} alkoxy group, an amino group, a nitro group, a cyano group, a carboxyl group, a C_{2-10} acyl group, a C_{2-6} alkoxycarbonyl group, a C_{1-6} alkylthio group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, a C_{2-10} acylamino group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, an N-(C_{1-6} alkyl)aminocarbonyl group and an N,N-di(C_{1-6} alkyl)aminocarbonyl group; a pyridyl group; a thienyl group; a furanyl group; or pyrimidinyl group, and Z^Y independently represents a hydrogen atom; a halogen atom; a C_{1-6} alkyl group which may be substituted with one or more substituents selected from the group consisting of a halogen atom, a hydroxyl group and a C_{1-6} alkoxy group; an optionally halogen-substituted C_{3-7} cycloalkyl group; a carboxyl group; or a C_{2-6} alkoxycarbonyl group)], or a pharmaceutically acceptable salt thereof or a hydrate thereof.

6. The compound according to any one of claims 1 to 4, wherein the moiety represented by the formula:



is a pyrazole group represented by the formula:

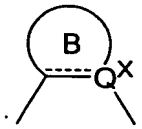


[wherein when Q^A is N and Q^B is $-N-Z^1$ or when Q^A is $-N-Z^2$ and Q^B is N, Q^C represents $-C-Z^3$, or alternatively, when Q^B is N and Q^C is $-N-Z^4$ or when Q^B is $-N-Z^5$ and Q^C is N, Q^A represents $-C-Z^6$

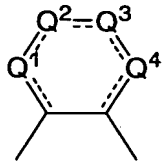
(wherein Z^1, Z^2, Z^4 and Z^5 each independently represent a hydrogen atom; an optionally halogen-substituted C_{1-6} alkyl group; an optionally halogen-substituted C_{3-7} cycloalkyl group; a C_{2-10} acyl group; a C_{2-6} alkoxycarbonyl group; a phenyl or C_{7-10} aralkyl group which may be substituted with one or more substituents selected from the group consisting of a halogen atom, a C_{1-6} alkyl group, a C_{1-6} alkoxy group, an amino group, a nitro group, a cyano group, a carboxyl group, a C_{2-10} acyl group, a C_{2-6} alkoxycarbonyl group, a C_{1-6} alkylthio group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, a C_{2-10} acylamino group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, an N-(C_{1-6} alkyl)aminocarbonyl group and an N,N-di(C_{1-6} alkyl)aminocarbonyl group; a pyridyl group; a thienyl group; a furanyl group; or a pyrimidinyl group, and Z^3 and Z^6 each independently represent a hydrogen atom; a halogen atom; a C_{1-6} alkyl group which may be substituted with one or more substituents selected from the group consisting of a halogen atom, a hydroxyl group and a C_{1-6} alkoxy group; an optionally halogen-substituted C_{3-7} cycloalkyl group; a carboxyl group; or a C_{2-6} alkoxycarbonyl group)], or a pharmaceutically acceptable salt thereof or a hydrate thereof.

7. The compound according to any one of claims 1 to 4,

wherein the moiety represented by the formula:

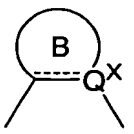


is a pyridyl group represented by the formula:

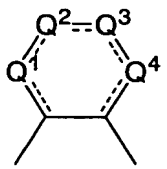


[wherein any one of Q^1 to Q^4 represents N and the other each independently represent -C-Z^7 (wherein Z^7 represents a hydrogen atom, a halogen atom, an optionally halogen-substituted C_{1-6} alkyl group, a C_{1-6} alkoxy group, an amino group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, a C_{2-10} acylamino group, a C_{2-10} acyl group or an optionally halogen-substituted C_{3-7} cycloalkyl group)], or a pharmaceutically acceptable salt thereof or a hydrate thereof.

8. The compound according to any one of claims 1 to 4, wherein the moiety represented by the formula:

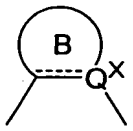


is a pyrimidyl group represented by the formula:

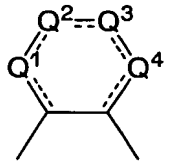


[wherein when Q^1 and Q^3 are each N, Q^2 and Q^4 each independently represent -C-Z^8, or alternatively, when Q^2 and Q^4 are each N, Q^1 and Q^3 each independently represent -C-Z^9 (wherein Z^8 and Z^9 each independently represent a hydrogen atom, a halogen atom, an optionally halogen-substituted C_{1-6} alkyl group, a C_{1-6} alkoxy group, an amino group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, a C_{2-10} acylamino group, a C_{2-10} acyl group or an optionally halogen-substituted C_{3-7} cycloalkyl group)], or a pharmaceutically acceptable salt thereof or a hydrate thereof.

9. The compound according to any one of claims 1 to 4, wherein the moiety represented by the formula:



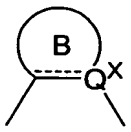
is a pyridazinyl group represented by the formula:



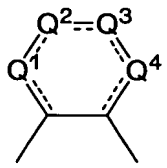
[wherein Q^1 and Q^2, Q^2 and Q^3, or Q^3 and Q^4 each represent N, and the other each represent -C-Z^{10} (wherein Z^{10} independently represents a hydrogen atom, a halogen atom, an optionally halogen-substituted C_{1-6} alkyl group, a C_{1-6} alkoxy group, an amino group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, a C_{2-10} acylamino group, a C_{2-10} acyl group or an optionally halogen-substituted C_{3-7}

cycloalkyl group)], or a pharmaceutically acceptable salt thereof or a hydrate thereof.

10. The compound according to any one of claims 1 to 4, wherein the moiety represented by the formula:

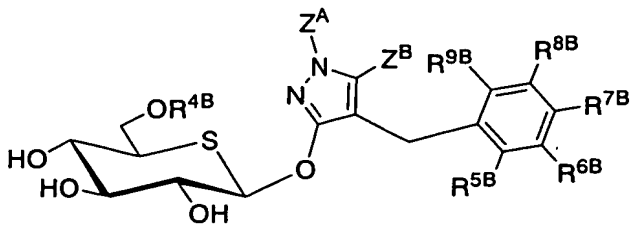


is a pyrazinyl group represented by the formula:



[wherein Q^1 and Q^4 each represent N and the other each represent -C-Z^{11} (wherein Z^{11} independently represents a hydrogen atom, a halogen atom, an optionally halogen-substituted C_{1-6} alkyl group, an amino group, a C_{1-6} alkoxy group, a C_{1-6} alkylamino group, an N,N-di(C_{1-6} alkyl)amino group, a C_{2-10} acylamino group, a C_{2-10} acyl group or an optionally halogen-substituted C_{3-7} cycloalkyl group)], or a pharmaceutically acceptable salt thereof or a hydrate thereof.

11. A 5-thio-β-D-glucopyranoside compound of the following formula or a pharmaceutically acceptable salt thereof:



(wherein Z^A represents a hydrogen atom, a C_{1-6} alkyl group, a halogen-substituted C_{1-6} alkyl group, a C_{3-6} cycloalkyl group, a benzyl group, a C_{2-10} acyl group or a C_{2-6} alkoxycarbonyl group, Z^B represents a C_{1-6} alkyl group or a halogen-substituted C_{1-6} alkyl group, R^{5B} to R^{9B}, which may be the same or different, each represent a hydrogen atom, a halogen atom, a C_{1-6} alkyl group, a halogen-substituted C_{1-6} alkyl group, a C_{3-6} cycloalkyl group, a C_{1-6} alkoxy group, a halogen-substituted C_{1-6} alkoxy group or a C_{1-6} alkylthio group, and R^{4B} represents a hydrogen atom, a C_{2-10} acyl group or a C_{2-6} alkoxycarbonyl group).

12. A pharmaceutical preparation, which comprises the 5-thio-β-D-glucopyranoside compound according to any one of claims 1 to 11 or a pharmaceutically acceptable salt thereof or a hydrate thereof as an active ingredient.

13. The pharmaceutical preparation according to claim 12, which is an inhibitor of sodium-dependent glucose transporter 2 activity.

14. The pharmaceutical preparation according to claim 13, which is a prophylactic or therapeutic agent for diabetes, diabetes-related diseases or diabetic complications.

15. A pharmaceutical preparation, which comprises the 5-thio-β-D-glucopyranoside compound according to any one of claims 1 to 11 or a pharmaceutically acceptable salt thereof or a hydrate thereof, in combination with at least one drug selected from the group consisting of an insulin sensitizer selected from the group consisting of a PPARγ agonist; a PPARα/γ agonist; a PPARδ agonist; and a PPARα/γ/δ

agonist, a glycosidase inhibitor, a biguanide, an insulin secretagogue, an insulin formulation and a dipeptidyl peptidase IV inhibitor.

16. A pharmaceutical preparation, which comprises the 5-thio-β-D-glucopyranoside compound according to any one of claims 1 to 11 or a pharmaceutically acceptable salt thereof or a hydrate thereof, in combination with at least one drug selected from the group consisting of a hydroxymethylglutaryl coenzyme A reductase inhibitor, a fibrate, a squalene synthase inhibitor, an acyl-coenzyme A:cholesterol acyltransferase inhibitor, a low-density lipoprotein receptor promoter, a microsomal triglyceride transfer protein inhibitor and an anorectic.